



## INTRODUCTION

The Comtech EF Data IP Modem (CiM) product line consists of IP (Internet Protocol) enabled satellite modems. With their innovative architecture and support for IP networking, the IP modems can meet almost any customer requirement for performance and functionality.

The CiM-550 is a high-performance, low-cost, IP-enabled satellite modem designed for closed network Single Channel Per Carrier (SCPC) links. It is ideal for many VSAT applications.

Offering a range of data rates from 2.4 to 2048 kbps in 1 bit per second steps, the modem includes Viterbi forward error correction as standard. The Turbo Product Codec is available as an option.

Turbo Product Coding (TPC) is a recent development in FEC techniques that delivers significant performance improvement when compared to Viterbi with concatenated Reed-Solomon. TPC simultaneously offers increased coding gain, markedly lower decoding delay (leading to improved TCP/IP performance), and bandwidth savings of up to 40%. The TPC option includes two modes that permit operation from exceptionally small antennas, where flux density issues are of concern.

## KEY STANDARD FEATURES

- 10baseT/100baseTX Ethernet interface
- Static IP routing for unicast and multicast
- Powerful network management
  - SNMP
  - Web
  - Telnet
- Remote software / firmware upgrade
- Data rates from 2.4 to 2048 kbps
- Symmetric as well as asymmetric operation for maximum bandwidth efficiency

## FEATURE ENHANCEMENTS

Enhancing the CiM-550's capability is easy. Additional features can be added quickly on site, using the FAST access code purchased from Comtech EF Data, or via software/firmware upgrade through FTP.

## OPTIONAL FEATURES

- IGMP
- Data Encryption
- Quality of Service (QoS)

## Data Encryption

- DES 56 data encryption
- Key management

The CiM-550 provides DES-56 data encryption to prevent unauthorized access to data over the satellite link. Users can change the factory-configured default keys on a link basis.

## Quality Of Service

- Traffic classification based on destination IP address
- Dynamic bandwidth allocation based on class configuration
- QoS statistics

The CiM-550 supports QoS management by destination IP address. It classifies incoming IP datagrams and allocates bandwidth to each flow based on the configured profile.

## CDM-550 EMULATION MODE

The CiM-550 can be made to operate in CDM-550 emulation mode, where it behaves exactly like the Comtech EF Data CDM-550 satellite modem. The emulation mode is selected from the front panel. However, IP functionality is not available in this mode.



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## SYSTEM SPECIFICATIONS (FULLY ENHANCED)

Frequency Range	52 to 88 MHz 104 to 176 MHz (option)
Input/Output Impedance	50 and 75 Ohms (Front panel selectable)
IF Connector	BNC, female
Data Interface	10baseT/100baseTX Ethernet (RJ-45 connector) DB25 female, providing: <i>(CDM-550 mode only)</i> EIA422/EIA530 DCE V.35 DCE X.21 DCE and DTE Sync / Async EIA232
WAN Encapsulation	HDLC <sup>1</sup>
Data Rate Range	
Rate 1/2 BPSK	2.4 to 1024 kbps
Rate 1/2 QPSK/OQPSK	4.8 to 2048 kbps
Rate 3/4 QPSK/OQPSK	7.2 to 2048 kbps
Rate 7/8 QPSK/OQPSK	8.4 to 2048 kbps
Rate 21/44 BPSK Turbo	2.4 to 1145 kbps
Rate 5/16 BPSK Turbo	2.4 to 750 kbps
Rate 1/2 QPSK Turbo	4.8 to 2048 kbps
(Fully Independent Tx and Rx rates)	
Scrambler	ITU V.35 self synchronizing Externally synchronized (synchronous) per IESS-308
FEC	
Viterbi	Rate 1/2, 3/4, or 7/8
Turbo	Rate 3/4 QPSK
Turbo	Rate 5/16 or 21/44 BPSK
Overhead Framed	5% overhead (Except Turbo BPSK modes, which add 1.5%)
EDMAC/AUPC	
AUPC	Target Eb/No Range: 0 to 9.9 dB Max AUPC Range: 0 to 9 dB
Monitor Functions	Distant end Eb/No Tx power level increase

## NETWORKING PROTOCOLS <sup>1</sup>

- Address Resolution Protocol (ARP)
  - Configurable Static ARP Entries
- Internet Protocol (IPv4)
  - Internet Control Message Protocol (ICMP)
  - IPv4 Routing
    - Configurable static routes
- User Datagram Protocol (UDP)
  - Transmission Control Protocol (TCP)
- Simple Network Management Protocol (SNMP)
  - Telnet
  - Hyper Text Transfer Protocol (HTTP)
  - File Transfer Protocol (FTP)

## OPERATIONS & MAINTENANCE <sup>2</sup>

- Configuration & Management
  - Console interface
  - SNMP with private, modem-specific MIB
  - Telnet
  - HTTP
- Remote software / firmware (IP Module) upgrade via FTP
- Local software / firmware (modem board) upgrade via console port
- Traffic statistics
- Faults & alarms
- Configuration backup & restore
- 1:1 Redundancy (optional) using external IF switch

## SECURITY <sup>1</sup>

- Password Protection
- Access List

## CONSOLE PORT <sup>1</sup>

Interface EIA-232 (RJ-12 connector)

## REMOTE PORT

Interface EIA-232 or EIA-485 (2- or 4-wire)

<sup>1</sup> Not available in CDM-550 mode

<sup>2</sup> Some features are not available in CDM-550 mode

## MODULATOR

Transmit Filtering	6 <sup>th</sup> order Butterworth, per IESS 308
Frequency Stability	± 1.5 ppm, 0 to 50° C
Harmonics and Spurious	< -55 dBc/4 kHz
Transmit On/Off Ratio	55 dB minimum
Phase Noise	< 0.24° rms double-sided (100 Hz to 1 MHz)
Output Power	0 to -20 dBm, 0.1dB steps
Accuracy	± 0.5 dB over frequency and temperature
Clocking Options	Internal (± 1.5 ppm) External (± 100 ppm tracking range) Loop timing (Rx sat clock)
Asymmetric Loop Timing	Master / Slave clock relationships Tx ≠ Rx data rate No step size limitation

## DEMODULATOR

Input Range	-30 to -60 dBm
Max Composite Level	+35 dBc up to a max of -5 dBm
Acquisition Range	± 1 to ± 30 kHz (1 kHz steps)
Acquisition Time	Depends on data rate, FEC rate and acquisition range
Example:	At 512 kbps, R1/2 QPSK, ± 30 kHz sweep, acquisition time = 0.25 seconds, average

## OPTIONS

- IGMP
- Data Encryption
- Quality of Service (QoS)
- Low Data Rate (up to 512 kbps)
- Turbo Product Codec

## ENVIRONMENTAL AND PHYSICAL

Temperature	Operating: 0 to 50°C Storage: -25 to 70°C
Power Supply	100 to 240 volts AC, 50/60 Hz
Power Consumption	22 W typical, 30 W maximum
Physical Dimensions	1U high, 12" (305 mm) deep
Weight	7 lbs (3.2 kg)
CE Approvals	EN55022 Class B (Emissions) EN50082-1 Part 1 (Immunity) EN60950 (Safety)
FCC Approval	FCC Part 15 Class B

## BER PERFORMANCE

(Met with two adjacent carriers 7 dB higher)

Guaranteed Eb/No, in dB (Typical values in parentheses)

Viterbi	1/2	3/4	7/8	
10 <sup>-5</sup>	5.4 (4.9)	6.8 (6.3)	7.7 (7.2)	
10 <sup>-6</sup>	6.0 (5.5)	7.4 (6.9)	8.4 (7.9)	
10 <sup>-7</sup>	6.7 (6.2)	8.2 (7.7)	9.0 (8.6)	
Sequential (64 kbps)	1/2	3/4	7/8	
10 <sup>-5</sup>	4.8 (4.2)	5.8 (5.3)	7.0 (6.6)	
10 <sup>-6</sup>	5.2 (4.5)	6.4 (5.8)	7.5 (7.2)	
10 <sup>-7</sup>	5.6 (4.8)	6.9 (6.3)	8.0 (7.7)	
Turbo Product Codec	1/2 (Q)	3/4 (Q)	21/44 (B)	5/16 (B)
10 <sup>-6</sup>	2.9 (2.6)	3.9 (3.5)	2.8 (2.5)	2.3 (2.0)
10 <sup>-7</sup>	3.1 (2.7)	4.1 (3.7)	3.1 (2.8)	2.6 (2.3)
10 <sup>-8</sup>	3.3 (2.8)	4.3 (4.0)	3.3 (3.0)	2.8 (2.5)
Receive Buffer	Selectable up to 8192 bits			
Monitor Functions	Eb/No, Frequency Offset, BER, Buffer fill status, coarse AGC value			

